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# THE MEDICAL JOURNAL OF AUSTRALIA.

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No. 2.

## POLIOMYELITIS: PATHOLOGICAL NOTES AND EXPERIMENTAL STUDY.\*

By **Reginald Webster, M.D. (Melb.),**  
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### Introductory.

The present communication furnishes a report on pathological observations and experimental work carried out at the Children's Hospital, Melbourne, in connexion with the recent epidemic of poliomyelitis.

It would seem desirable to supplement the descriptions—recently published in the *Journal*—of the Broken Hill<sup>1</sup> and Queensland<sup>2</sup> epidemics, with an account of the outbreak as witnessed in Melbourne. An epidemiological and clinical survey of the epidemic of last summer and autumn, has already been supplied by Dr. H. Douglas Stephens<sup>3</sup>; it remains to provide an account of the pathological aspects.

There were five fatal cases among seventy-five children admitted to the hospital with poliomyelitis; in three of the five there was opportunity for post-mortem investigation. All three fatal cases exhibited the rapidly-ascending type of paralysis and terminated in respiratory failure within four or five days from the onset of symptoms. It is not proposed to describe in detail the findings at autopsy; many such descriptions are extant and readily accessible. Certain points, however, may be worthy of a little elaboration.

### Macroscopic Features.

Particular attention was directed towards the visceral or systemic lesions, *i.e.*, those outside the central nervous system. The three cases under consideration having been instances of an overwhelming infection, it might have been anticipated that the systemic lesions would be correspondingly severe; they were manifest in a definite enlargement of the spleen and very pronounced swelling of the lymphatic glands, particularly those of the enteric mesentery.

It is a point worthy of emphasis that among the mesenteric glands the enlargement did not affect all the nodes uniformly, but in two of the cases the swelling was present to an extreme degree in those glands in immediate relation to the terminal portion of the ileum and the ileo-caecal junction. As the mesentery was traversed in a proximal direction the size of the glands progressively diminished, although all were distinctly enlarged. In these two instances (L.S. and M.N.) also, there was pronounced hyperæmia of the ileal mucous membrane and irritation of the lymphoid tissue, as evidenced by injected and swollen Peyer's patches.

The combined appearances in lymph glands and intestinal mucous membrane were very suggestive of an intestinal atrium of infection in these two instances and an (unsuccessful) attempt was made to determine the location of the virus in the swollen glands (Experiment I.). Although the attempt to infect a monkey from the gland emulsion did not suc-

ceed, the post-mortem appearances which I have endeavoured to describe still remain as indicating the possibility, or even probability, of an intestinal mode of infection. It may be noted here that diarrhoea was a feature from the onset and persisted throughout the rapid course of the illness of the child M.N.

There was evident in all three cases a condition of engorgement of the kidney, with injection of the sub-capsular vessels; turgid Malpighian tufts could be discerned in the cut surface when viewed horizontally. These indications of a mild degree of nephritis were confirmed microscopically, and in the urine of two of the non-fatal cases red blood cells, leucocytes, and granular casts were detected.

The intensity of the pathological process in one of the cases (M.N.) is represented in Figure I. The sec-



Figure I.

Macroscopic View of Lumbar Cord, exhibiting an extreme lesion.  $\times 3$ .

tion is from the lumbar cord, and shows the gross hæmorrhage in the anterior grey matter, the anterior horns being delineated by the extravasation of blood therein. This specimen is figured as an extreme case and not as typical of a common lesion. The severe process illustrated by the photograph occupied approximately 2 cm. of the lumbar cord, the lesion becoming gradually less and less marked the higher in the cord the section was made.

In one case only (L.S.) was there macroscopic evidence of affection of the cerebrum. In this instance the pia-arachnoid over the convexity of the brain was very oedematous, and the intense hyperæmia brought into prominence all the minute vessels. The child had manifested clinically a course identical with the type described as "poliomyelitis with deep stupor"; he was admitted after three days of illness, deeply comatose, and did not regain consciousness. Although the appearance of the brain and the clinical course led one

\* Read at a Meeting of the Victorian Branch of the British Medical Association on November 13, 1918, and Subject of a Lantern Demonstration given at the Melbourne Pediatric Society on December 18, 1918.

to suspect a degree of encephalitis, it will be seen that the principal lesions were found in the bulbo-spinal tract. As will be shown below, encephalitic cases were the exceptions in the series observed at the Children's Hospital.

#### Microscopic Features.

Pieces of cerebral cortex, basal ganglia, posterior root ganglia, medulla and various levels of the cord were appropriately treated, and sections obtained by the method of paraffin embedding. Van Gieson's method was used as the routine stain throughout, and in one series of sections (A.H.) a duplicate set was treated by the Weigert method.

An outstanding feature of the microscopic examination was the comparative paucity of lesions above the bulbo-spinal tract. Even in the case above described (L.S.), in which the naked-eye appearances were very suggestive of encephalitis, the microscopic examination showed engorgement of vessels in the meninges and perivascular and interstitial mononuclear cell collections, but these lesions were not pronounced in the cortical grey matter nor in the substance of the basal ganglia. In the two other cases no microscopic evidence of the incidence of the virus on the cerebrum was elicited. Although the data obtained from a study of three cases hardly suffice to base thereon conclusions applicable to the epidemic as a whole, they may be taken in conjunction with the clinical observations. From notes compiled by Dr. Annie L. Bennett, the resident medical officer in charge of the poliomyelitis patients, it would appear that the proportion of cases presenting an encephalitic aspect was very low. Dr. Bennett noted only one case of the seventy-five admitted in which the encephalitic features were dominant. Apparently, therefore, the extensive involvement of the brain described by Breinl<sup>2</sup> in his communication of March 23, 1918, was a distinctive feature of the Queensland epidemic, and one is led to wonder whether the same virus was operating in the two visitations. This point will be returned to subsequently in connexion with the experimental work.

The lesions in the medulla consisted of perivascular cell accumulations of small round cells, with a small proportion of polynuclear cells: the perivascular spaces were distended with such cells, and surrounding the vessel with its bank of cells was in many instances a clear space, which might be attributed to rarefaction of the nervous tissue consequent on the outpouring of inflammatory exudate. The vascular lesions were most pronounced immediately under the floor of the fourth ventricle, and diminished greatly in intensity as the ventral surface of the medulla was approached—an observation which seemed to indicate that the virus had reached the medulla *via* the vessels of the choroid plexus in the roof of the fourth ventricle.

Focal accumulations of round cells, apparently not in relation to blood vessels, were present throughout the section, as was also a diffuse cellular infiltration. Parenchymatous lesions, *i.e.*, those affecting the nerve cells, were not so prominent as in the sections of the cord; many of the ganglion cells appeared unaffected, and a small proportion only showed encircling cell clusters, poor staining, or other evidence of morbidity.

The cord lesions were well marked in all three cases, and may be summarized as perivascular, parenchymatous and interstitial.

Space will not permit of a detailed description of the microscopic picture, nor is it necessary, as such

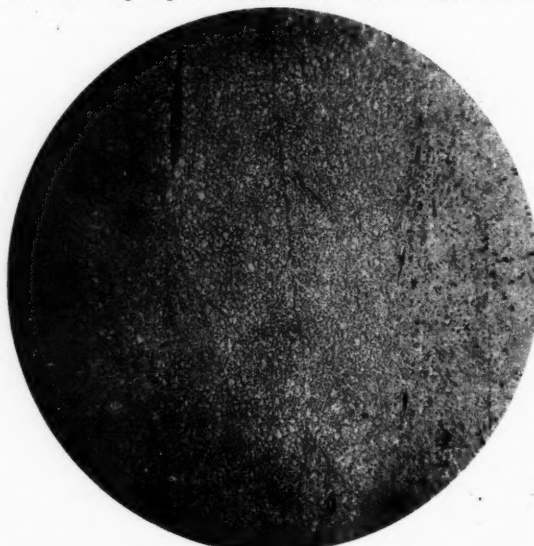


Figure II.  
Low-Power Field, showing the manner in which the virus may reach the posterior cornu.

description will be found set out by Breinl<sup>2</sup> and Campbell,<sup>4</sup> *et aliq.*, in recent numbers of the *Journal*.

Examination of the series of sections impressed one strongly with the inadequacy of the term "anterior poliomyelitis." Figure II. is a low-power reproduction

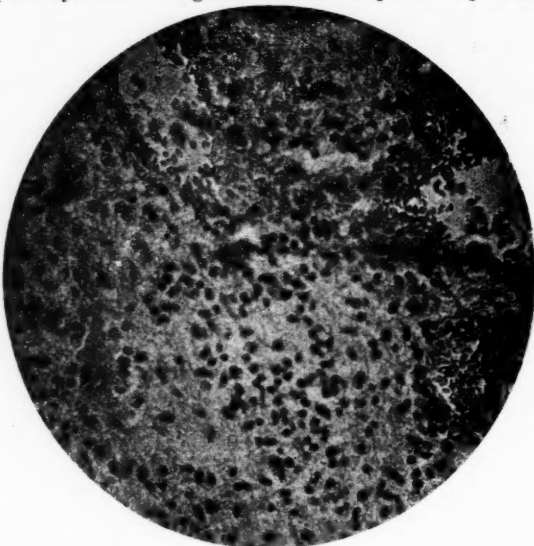


Figure III.  
High-Power Field, illustrating extreme vascular engorgement and diffuse cellular infiltration.

tion of a section from the dorsal cord, showing the cell reaction along the course of a vessel entering immediately medial to the posterior horn of grey matter. The central canal is seen towards the bottom of the



photograph, the anterior horns not appearing in the field.

The perivascular cell collection is well observed lying in apposition with the posterior cornu of grey matter. The cell reaction may fairly be taken as an index of the path of the virus, and the section illustrates the manner in which the posterior horn may become involved. Another section (Figure III., obtained from the level of Figure I.) shows the cellular infiltration and small extravasations of red blood cells at the base and well out towards the periphery of the posterior horn. Indeed, evidence of involvement of the white matter is not wanting, and the term "anterior poliomyelitis" connotes, at best, a limited conception of the pathology of this disease.

I was especially interested in the changes in the posterior root ganglia, and in all the poliomyelitic specimens studied lesions in the spinal ganglia were noted.

They consisted of a scattered infiltration of the supporting tissues, with mononuclear cells, and, as a rule, more intense aggregations of cells towards the



Figure IV.  
High-Power View of Section of Posterior Root Ganglion (vide text).

periphery of the ganglion. The ganglion cells themselves were shown in all stages of affliction, the worst affected being merely "ghosts," with no nucleus and occupied by phagocytic cells (Figure IV.).\*

In a recent survey of the epidemic, Dr. H. Douglas Stephens<sup>3</sup> called attention to peripheral tenderness as frequently being so much in evidence as to bring scorbatus into the differential diagnosis; further, the tenderness often persisted for some weeks, sometimes necessitating delay in the institution of massage treatment. May not this clinical feature be correlated with the lesions in the posterior root ganglia? An analogy is supplied by the hyperæsthesia exhibited in *herpes zoster*, which may precede the eruption and sometimes persists for many weeks after the skin lesions have subsided. Draper<sup>5</sup> associates the "spine sign," so frequently elicited clinically in poliomyelitis, with

the inflammatory condition of the spinal ganglia, attributing this phenomenon to the fact that any attempt to flex the vertebral column induces traction on the inflamed ganglia, and is either resisted by the child or neutralized by the assumption of an opisthotonic position.

#### Cerebro-Spinal Fluid.

Lumbar puncture was not made a routine procedure in the cases admitted to the Children's Hospital. In many of the cases the diagnosis was established at the time of admission, and as the application of serum therapy was on a necessarily limited scale, as will be shown later, the majority of the patients were not subjected to spinal puncture.

The laboratory examination of the fluid can scarcely be said to furnish a diagnostic criterion in poliomyelitis; taken in conjunction with the clinical aspect, it may have confirmatory value and may also be of considerable assistance by virtue of what it rules out, *viz.*, meningismus and the acute forms of meningitis dependent on organisms such as *meningococcus*, *pneumococcus* and *b. influenzae*.

On more than one occasion I found it impossible to differentiate by examination of the spinal fluid alone between poliomyelitis and tuberculous meningitis. The increased volume and pressure, the globulin reaction and a similar cell content in a usually clear fluid obtain in both conditions, and it is a truism that tubercle bacilli in cerebro-spinal fluid are frequently very elusive.

I made it a routine procedure to enumerate the cells present in the specimens of spinal fluid sent to the laboratory, and took measures to ensure that no time was lost between the lumbar puncture and the cell count. Of the fluids thus examined (sixteen in all), the highest cell count obtained was 520 per c.mm.. The counts obtained in several of the most severe cases, all with extensive paralysis, were respectively 80, 200, 520, 200 and 350. Thus it will be seen that in no instance was a particularly high figure obtained, and this circumstance I am inclined to attribute to two possible causes: (1) variability in the degree of meningeal involvement; (2) the specimen being obtained comparatively late in the course of the infection. *Apropos* of the first-mentioned possibility, I may state that, in the course of the examination of the cord and brain sections from the clinical and experimental cases, I noticed considerable variation in the degree of meningeal irritation in the individual cases, as evidenced microscopically. This may have been due in some degree to differing periods of time elapsing between the initial meningeal invasion and death; as all three human cases were instances of the fulminant type of infection, it is unlikely that this factor was of much importance. Still less did it hold for the experimental disease, the fatal cases of which all terminated fatally within 24 to 36 hours after the initial onset of symptoms.

Whereas in some of the cord sections very marked infiltration of the pia-arachnoid with small round cells and a proportion of multinucleated cells was a feature, in others there was no interstitial cellular infiltration of the meninges, or, at most, a mild perivascular reaction at the anterior and posterior fissures of the cord. These variations, apparent histologically, in the intensity of the meningeal involvement may be

\* The photomicrographs have been prepared by Messrs. Dickinson and Preston, of the Melbourne University.

correlated with irregular findings in the cerebro-spinal fluid. The apparent discrepancies sometimes noted between the obvious severity of a clinical case and the variable findings in the cerebro-spinal fluid are explicable on the basis of the foregoing.

With regard to the second factor mentioned as possibly affecting the cell content of the fluid, it has already been mentioned that many of the patients were not brought to hospital until paralysis was evident, and the supervention of paralysis is a late stage in poliomyelitis as now viewed pathologically. The high cell counts would be expected in specimens taken as soon as possible after penetration of the choroid plexus by the virus, when the consequent reaction in the meninges would be at its maximum. The following table shows the tendency of the cell count to fall the longer the period elapsing between the enumeration of the cells and the invasion of the nervous system by the virus:—

Case.	Day of Examination After Appearance of Nervous Symptoms.	Cell Count. Per c.mm.	Remarks.
Joe H.	Second day	520	Definite, though slight, stiff neck. Kernig's sign positive. No paralysis developed.
W.L.	Third day	350	Extreme head retraction; paralysis of anterior tibial groups and quadriceps (both sides).
G.L.	Fourth day	200	Marked stiff neck; eight days later slight action of left quadriceps; paralysis of dorsiflexors of left foot.
John H.	Fourth day	200	Aphonia; unable to swallow; retention of urine; respiratory failure; death.
H.M.	Sixth day	60	Slight stiff neck; left deltoid paralysis; subsequently developed right deltoid paralysis and extensive paralysis of lower limbs.
E.T.	Seventh day	80	Stiff neck; paralysis of right deltoid; paresis of both quadriceps; twelve days later double deltoid paralysis.
V.T.	Ninth day	10	Marked stiff neck at onset; staring eyes; unconscious; squint on fourth day; left hospital on thirteenth day with no paralysis other than the oculomotor.

A high cell count may be interpreted as indicative of a violent attack by the virus upon the meninges, but it does not follow, necessarily, that the affection of the actual nervous tissue will be correspondingly severe. The first case in the foregoing table is interesting from this point of view; the child manifested the highest cell count of the series, yet recovered without exhibiting paralysis at any time.

#### Experimental.

In the following experiments the animals were inoculated with virus by the intracerebral method, as being the most regularly successful. Anaesthesia was induced by chloroform and maintained with ether, and a hole drilled in the skull, through which the dose of virus was introduced directly into the brain.

*Experiment I.*—A lymphatic gland from a particularly swollen and turgid group in relation to the ileo-caecal junction was removed under aseptic precautions from the mesentery of the child M.N. at autopsy. The gland was teased out and ground into an emulsion with 33% glycerine in 0.85% saline solution; 2 c.cm. of such emulsion was injected into the left frontal lobe of monkey No. 1 (*Macacus rhesus*). The monkey, which was a very active animal, recovered from the anaesthetic promptly and did not at any time subsequently exhibit the slightest disturbance of health.

*Experiment II.*—April 26. The same animal as in Experiment I. was injected intracerebrally (1.5 c.cm.) and intraperitoneally (4 c.cm.) with cerebro-spinal fluid from a case of poliomyelitis of eight days' duration. The fluid showed excess of globulin (Ross Jones test) and a cell count of 60 per c.mm. Again, the animal did not appear to be upset in the least degree.

*Experiment III.*—April 17. Monkey No. 2, a large animal, and apparently very old. Portion of the cervical cord of the child M.N., removed at autopsy on March 23 and preserved in glycerine and saline solution, was ground into an emulsion with 33% glycerine and saline solution. Of this emulsion, 1.5 c.cm. was injected into the left orbit of the animal. The injection reached the orbit inadvertently, for the scalp was fixed by traction backwards, in order to make the skin incision, and when it was released the incision was placed much further forward than was intended, so that the drill penetrated the junction of the frontal and orbital plates. That the virus reached the sub-arachnoid space, presumably along the sheath of the optic nerve, was evident from the subsequent course of the experiment.

To all appearances the animal remained well until the eighth day after inoculation, the marked exophthalmos, which supervened immediately on the operation, subsiding within 24 hours.

On the afternoon of the eighth day—April 25—it was evidently very ill, with rapid respirations (80 per minute) and a temperature of 40.5° C.

Ninth day.—9.30 a.m.: It was somewhat improved systemically, but had lost all power of grip in the hands. 2.30 p.m.: The animal made no attempt to grasp a stick, which it had formerly gripped tenaciously.

Tenth day.—9.30 a.m.: It was unable to walk, although it still preserved some power of movement in its hind limbs; the fore limbs were completely paralysed. 2.30 p.m.: It was prostrate, and was therefore chloroformed.

Autopsy.—The brain showed no obvious lesions, the absence of oedema and hyperaemia being particularly noted. The cord exhibited a pinkish and hyperaemic appearance, due to injection of many tiny vessels. The engorgement of the medullary vessels was most marked, and the grey matter of the cord appeared distinctly pink, protruding a little on cross section of the cord. No visceral lesions were obvious,

but the animal was extremely fat. At the onset the monkey's appearance was strongly suggestive of pneumonia, but no such condition was found post mortem.

Portion of the cord was placed in glycerine and saline solution; the remainder, with cerebrum and brain stem, in 4% formalin.

Sections of cerebral cortex, basal ganglia, medulla, different levels of the cord and posterior root ganglia were prepared by the method of paraffin embedding. Lesions typical of poliomyelitis were present in the medulla and cord sections, but invasion of the higher reaches of the nervous system was not apparent. The changes in the posterior root ganglion were well observed and were similar to those described in the human cases.

*Experiment IV.*—African Monkey No. 3. April 30, 1918. This animal was inoculated intracerebrally with 1.5 c.cm. of cord emulsion from the monkey of the previous experiment. It remained perfectly well until the sixth day after the operation. On the morning of May 6 the animal had lost all power of movement in the hind limbs, and was noticed to be very tremulous and unable to hold the head still. It was still able to drag itself along by grasping the wires of the cage with the fore limbs. The temperature taken at this time was 38.4° C. At 4 p.m. on the same day the animal was on "all fours" and quite unable to support itself on the fore limbs. Death occurred during the night.

*Microscopic Sections of Cord, etc.*—There were changes of maximum intensity throughout the cord, extreme degrees being manifest in the lumbar region. The lesions were less severe, though definite, in the medulla, and were not observed in sections of the cortex and basal ganglia. One noted hæmorrhagic inflammation throughout the grey matter of the cord, anterior and posterior. Vessels entering by the postero-medial and postero-lateral fissures of the cord showed the perivascular cell reaction in a marked degree. The inflammatory phenomena were well sustained in the meninges, especially in the anterior and posterior fissures. There were also noted small perivascular foci in the white matter. Small-celled aggregations were evident in the posterior root ganglion; the ganglion cells in many instances were mere "ghosts," with loss of nucleus and poor staining.

Thus it will be seen that experimental poliomyelitis was induced in the monkey No. 2 from the cord of a human being dead of the disease—a repetition of the now classical experiments of Flexner and Levaditi, Landsteiner and Popper.

The primary object of the inoculation, however, was to obtain by "passage" a virus consistently potent for the monkey, one that could be relied upon to produce infection regularly in further experimental work. The virus was therefore passed from the second monkey to the third, and the cord of the last-mentioned animal obtained as a source of virus. It may be noted in passing that the incubation period was reduced from eight days to six in comparing the course of events in the two animals—an indication of the adaptation of the virus and its increasing potency to the monkey.

With the remaining five animals at my disposal I planned a necessarily short series of experiments to determine the comparative efficacy of serum derived

from a person recently ill with poliomyelitis and that from another patient with an old-standing infection. The use of serum in the treatment of poliomyelitis in man was first advocated by Netter,<sup>6</sup> who used serum from individuals at varying periods after they had recovered from the disease, even as long as thirty years afterwards. It seems natural to anticipate that the serum from a convalescent would be richer in immune bodies, and therefore more effective therapeutically, than that from a person who had recovered several years before. But it is a matter of great importance that the anti-poliomyelitic nature of the serum used intrathecally should be above suspicion, as actual harm may be inflicted by the use of a non-specific serum. The damaging effects of such a serum have been demonstrated by the Rockefeller workers<sup>7</sup> in a brilliant series of experiments, in which it was shown that the intrathecal injection of normal serum, and even such a physiologically perfect fluid as Ringer's solution, rendered monkeys susceptible to intravenous doses of virus to which they were formerly resistant. The result was attributed to damage sustained by the choroid plexus, with consequent impairment of its function of guardian over the cerebro-spinal space, rendering it more easily penetrable by the virus.

Flexner<sup>7</sup> has demonstrated the power of serum from convalescent human patients and monkeys recovered from the experimental disease to protect monkeys against experimental inoculation. In order to familiarize myself with the technique of this type of experiment, and at the same time to provide a standard of comparison, I thought it advisable to carry out an experiment with serum derived from a child convalescent from poliomyelitis.

*Experiment V.*—Monkeys Nos. 4 and 5. June 11. Both baby animals. Monkey No. 4 served as a control animal, and was given an intracerebral inoculation of 0.5 c.cm. of freshly-prepared (monkey) virus. Monkey No. 5 was injected immediately afterwards with the same amount of the same virus, also by the intracerebral route. At the time of operation 2 c.cm. of cerebro-spinal fluid was withdrawn and 3 c.cm. of immune serum, obtained from a child in the hospital, introduced into the spinal canal.

June 13, 1918.—Lumbar puncture was performed on this animal (No. 5) and 3 c.cm. serum given intrathecally. The cerebro-spinal fluid withdrawn, when examined microscopically, showed red blood cells only.

June 15, 1918.—Lumbar puncture was performed and 2 c.cm. serum injected intrathecally.

June 17, 1918.—Lumbar puncture was performed and 3 c.cm. serum injected intrathecally.

June 18, 1918.—Lumbar puncture was performed and 2 c.cm. serum injected intrathecally.

After the fourth puncture the spinal fluid was noticed to be turbid. Examination disclosed a marked polynucleosis (serum reaction). No organisms were observed and the fluid was proved to be sterile by ordinary methods of culture.

This animal remained perfectly well, and was never upset by the various procedures.

Monkey No. 4, the control animal, was given no treatment.

June 18, 1918.—On the seventh day after inocula-



tion the following notes were made: The animal is irritable. It screams when approached and ruffles its hair. It protects its right arm and uses it only occasionally. It will not grasp with the right hand. On the same morning it was placed under anaesthetic for lumbar puncture. The fluid was turbid, but the turbidity was not due to cells. Instead, one found a structureless material, and no organisms were discernible under  $\frac{1}{12}$  in. oil immersion lens. A half of a cubic centimetre of this fluid was placed in hydrocele fluid under anaerobic conditions and a turbidity appearing on the seventh day raised false hopes, as it was found to be due to staphylococci—evidently a skin contamination.

A similar turbidity in the cerebro-spinal fluid was encountered in each of the two monkeys of the next experiment.

Daily spinal punctures were undertaken with these two animals, and after the third puncture in one case and the fourth in the other an appearance in the fluid exactly similar to that described for monkey No. 4 was noted. Microscopic examination again failed to disclose a sufficient cellular content to account for the turbidity, but a comparison of the microscopic appearance of the spinal fluid with that of the emulsion used for inoculation furnished the explanation.

In the process of intracerebral injection, some of the emulsion may have escaped into the sub-arachnoid space, but it seems much more probable that the injection found its way into the lateral ventricle, and was disseminated by the cerebro-spinal fluid, to reappear at lumbar puncture.

From the seventh to the sixteenth day the animal (No. 4) manifested decided weakness in the right arm. Towards the end of this period it became evident that the affection of the arm was an extensor group paralysis, with well-marked wrist drop. The animal became very thin and miserable. There was no extension of the paralysis, and it was chloroformed on the nineteenth day after inoculation.

Post-mortem.—Emaciation was advanced. There was a group of enlarged and caseous mediastinal glands, and the monkey was the subject of pulmonary tuberculosis.

No macroscopic indication of any affection of the central nervous system was observed. There was no change apparent at the site of inoculation, and no tuberculous affection of the meninges. The brain and cord were preserved in 4% formalin, and the following microscopic specimens subsequently prepared and studied.

Cortex, basal ganglia, medulla.—No changes noted.

Cervical cord.—Various accumulations of mononuclear cells were present throughout the grey matter, and particularly in relation to the ganglion cells. Numbers of nerve cells were shown surrounded, and in some instances invaded, by mononuclear cells. Ganglion cells in many instances stained poorly, with no distinguishable nucleus, and in others were vacuolated and occupied by neurophages. The perivascular phenomena were not evident, and the changes throughout were much less intense than those occurring in animals killed in the acute stage.

The foregoing experiment demonstrates the power of serum derived from a convalescent human case to

protect the monkey against experimental inoculation with the poliomyelitic virus.

*Experiment VI.*—Monkeys 6 and 7. Both baby animals of *Macaque* species.

August 6, 1918.—Both these animals were given the same dose (0.5 c.cm.) of virus intracerebrally, and both received the same energetic treatment. Monkey No. 6 was given serum obtained from a subject of poliomyelitis of the 1908 epidemic; monkey No. 7 received normal human serum.

Care was taken to treat both animals on strictly parallel lines, in order that the observations might be comparable. The procedure was as follows:—

August 6, 1918.—Both animals were anaesthetized and 0.5 c.cm. of virus introduced into the frontal lobe of the cerebrum. Two cubic centimetres of cerebro-spinal fluid were withdrawn and an equal quantity of each of the respective sera administered intrathecally. Thereafter a daily intraspinal injection of serum was given to each animal. Both remained well and active until the fifth day (August 11, 1918), when monkey No. 7, receiving normal serum, manifested signs of illness in tremor, excitability and irritable raising of the hair when approached. Each animal was given his dose of serum as usual.

By the afternoon of August 11 monkey No. 7 exhibited definite weakness of the hind limbs; on the morning of the following day it was completely paralysed in the hind limbs, and could scarcely support itself with its fore limbs. Four hours later it was completely prostrate, and was therefore chloroformed.

Monkey No. 6—receiving serum from a patient of the 1908 epidemic of poliomyelitis—had remained perfectly well up to this time, and the daily intraspinal injection was continued.

It received a dose of serum on the morning of the eighth day after inoculation (August 14, 1918), and recovered perfectly from the anaesthetic, appearing particularly well and active. The onset of its illness was very abrupt; during the afternoon it was noticed to be very tremulous and disinclined to move about. When stimulated it moved very sluggishly, shambling along on his haunches. By the following morning it was definitely paralysed in its hind limbs. The usual intraspinal dose of serum was given, and, in addition, 4 c.cm. into the peritoneal cavity.

It was apparently of no avail in arresting the progress of the infection, as the animal succumbed during the night. When the animal was last seen the paralysis had involved the forearms and was evidently ascending rapidly.

In this experiment both varieties of serum chosen are shown to be inefficient in protecting a monkey against experimental inoculation. The fact that the onset in the case of the animal treated with normal serum preceded that in the case of the animal treated with old poliomyelitis serum can scarcely be taken as indicative of any virtue in the latter serum, as monkey No. 7 was the smaller of the two animals and had been always less vigorous than monkey No. 6.

#### Discussion.

*Experiment I.*—Concerning the attempt to infect a monkey from the swollen mesenteric glands secured at autopsy, the only comment that occurs to one is



that the gland was obtained too late in the course of events to detect the virus in its substance. By sacrificing animals at varying intervals after intravenous inoculation, Flexner<sup>7</sup> and his associates have found that the virus rapidly disappears from the blood, is then localized in the spleen, bone-marrow and lymphatic system and finally in the central nervous system. Hence it is largely a matter of the stage of the disease which determines the location of the virus in the different tissues. The post-mortem appearances in this instance, particularly the distribution of the lymphatic enlargement, were very suggestive of an intestinal infection, and the failure to detect the virus in the affected glands cannot be said to disprove this possibility. May not the virus, after exciting reaction in the lymphatic gland in effecting its entrance, have subsequently disappeared from these tissues, just as it does from the blood after intravenous inoculation?

*Experiment II.*—Failure to communicate poliomyelitis, utilizing cerebro-spinal fluid. Numerous experiments at the Rockefeller Institute have uniformly failed to demonstrate the virus in the spinal fluid in poliomyelitis. In this connexion it is of interest to note that Breinl,<sup>2</sup> working with material derived from his encephalitic cases (the so-called "mysterious disease"), succeeded in infecting a monkey with cerebro-spinal fluid. Having regard to the negative results of the Rockefeller workers with reference to the presence of virus in the cerebro-spinal fluid, and also bearing in mind the aberrant clinical features of the Queensland cases, I would suggest that the two epidemics were not due to identically the same virus, although the infecting agents in the two outbreaks have the one main feature in common, i.e., a selective action on the central nervous system.

*Serum Experiments.*—With the monkeys at my disposal I planned the short series of experiments above described, in order to obtain, if possible, some experimental data in relation to the comparative efficacy of the three types of sera.

The sera used were chosen from (i.) a child with very extensive paralysis, whose illness had extended over two months, (ii.) a subject of the 1908 epidemic of poliomyelitis, and (iii.) my own serum.

The animal treated with the serum from a recent acute attack did not develop the disease; the other two succumbed to a rapidly advancing paralysis, the pathological (microscopic) findings in both cases being typical of experimental poliomyelitis.

Several considerations induced me to apply the serum treatment intraspinally. The object of the specific immune prophylaxis was to secure neutralization of the virus before its fixation by the central nervous system, and the desired result seemed attainable by attacking the virus in the blood stream, or by intercepting it while in transit from the blood to the central nervous tissues; in other words, in the cerebro-spinal space.

Immune serum administered intravenously inevitably becomes largely diluted in the blood stream, whereas serum injected directly into the spinal canal is enabled to act in greater concentration on the virus. I therefore endeavoured to maintain a constant, high antibody content in the cerebro-spinal space, by daily intrathecal injections of the serum under investigation. Probably the effect of the immune serum would

have been enhanced by supplementary intravenous injections, but the very small size of the monkeys precluded such a procedure, by introducing such difficulties of technique as would have jeopardized the whole experiment.

In connexion with the apparent lack of protective power in the old poliomyelitic serum, and in the normal serum, it would appear that any result achieved in serum therapy must depend upon a specific neutralizing quality in the serum used. Otherwise, if the beneficial effect were merely the result of the injection of a protein, with consequent cellular response, all sera, including normal horse serum, should be equally effective. That they are not is indicated by the results of the foregoing experiments. I had hoped to demonstrate the presence of neutralizing substances in the serum of the patient infected with poliomyelitis ten years ago. A much larger field is available from which to draw supplies of serum for therapeutic use than when the choice is confined to the very recent subjects of poliomyelitis. The amount of serum obtainable from human poliomyelitic sources is necessarily limited, and it is not surprising to note that normal human serum, and even normal horse serum, have been used to make good the deficiency of specific immune serum. It may be urged that the substitute sera would, at least, do no harm. That they do not possess even this negative virtue, but, when used intraspinally, actually facilitate the invasion of the central nervous system by the virus, has been shown by the experimental work of Flexner and Amoss<sup>7</sup> previously quoted.

The experiments conducted at the Children's Hospital show the inefficacy of serum ten years after the donor's attack, and, presumably, of that derived from cases of longer standing.

Hence, unless serum can be obtained from a subject whose attack is fairly recent (serum from a person five years after the attack was found to be effective clinically), it is best avoided altogether, at any rate for intraspinal administration.

An attempt was made at the Children's Hospital, Melbourne, to organize serum treatment at the time of the epidemic. A circular letter was sent to 35 former patients, subjects of poliomyelitis within the last five years and resident within the metropolitan area. Seven responded, the mothers of three of whom objected to the procedure of blood-letting.

The remaining four were small children, and I experienced difficulty in obtaining blood in the quantities required. Thus it is not possible to contribute any clinical facts as to the beneficial or other effects of serum from the experience of the past epidemic.

I wish to express a sense of great obligation to Mr. D. Le Souef, Director of the Zoological Gardens, Melbourne, for much valuable help and advice; to Dr. Helen Kelsey I am indebted for numerous anaesthetics and much general assistance.

The microscopic sections in connexion with the work were consistently well prepared by Mr. A. T. Adams.

#### References.

- <sup>1</sup> G. H. Burnell—*The Medical Journal of Australia*, April 6, 1918.
- <sup>2</sup> A. Breinl—*The Medical Journal of Australia*, March 16 and 23, 1918.

<sup>2</sup> H. D. Stephens—*The Medical Journal of Australia*, April 6, 1918.

<sup>4</sup> Campbell, Cleland and Bradley—*The Medical Journal of Australia*, February 16, 1918.

<sup>5</sup> Draper—"Acute Poliomyelitis," Philadelphia, 1917.

<sup>6</sup> A. Netter—*Bulletin de l'Académie de Médecine*, Paris, 1915, 74, 203.

<sup>7</sup> Flexner and Amoss—*Journal of Experimental Medicine*, 1914, XX., 249.

## Reports of Cases.

### CÆSAREAN SECTION (ABDOMINAL) IN TRANSVERSE PRESENTATION.<sup>1</sup>

By A. Krakowsky, M.D.,  
Renmark, South Australia.

On October 7, 1918, a midwife sent for me to attend a woman, aged 40 years, a multipara, who had been in labour for an hour or more.

*Previous History.*—The woman had had three previous confinements. Forceps had been used in two of the labours, 22 and 20 years ago, and, as she expressed it, she had had "a bad time." The third child was born eleven years ago without instrumental aid.

*Present Condition.*—I found the patient semi-conscious and exhausted, with signs of eclampsia. An external examination revealed a full-time pregnancy. The long axis of the uterus was placed in the transverse diameter, the hard, resisting head was felt in the right iliac fossa and the breech in the left.

The membranes protruded as a narrow pouch. They had ruptured a short time previously, and the liquor amnii was escaping. The presenting part was placed very high up. I could not determine what it was until the patient was anesthetized with chloroform. I was then able to make out the acromion spine of the scapula and a fold of the axilla. From the direction it was clear that the position was dorso-anterior.

As the shoulder was jammed in the pelvis and the fœtus was firmly fixed, I could not expect either a spontaneous version or evolution of the head or breech, as happens in some cases. It was impossible to alter the position of the fœtus, either by external manipulation, bipolar method or podalic version. I tried all of these. I therefore decided to remove her at once to the Renmark Hospital. Instead of losing further time in attempting decapitation, embryotomy or other impracticable procedures, I decided to deliver by abdominal Cæsaean section.

The patient was prepared in the ordinary way, and was anesthetized with ether. I made the usual incision in the *linea alba*, from 1.25 cm. below the umbilicus downwards for about 11 cm. A similar opening was made in the peritoneum. The uterus was then lifted out of the abdominal cavity. An incision about 10 cm. in length was then made in the uterus, and I was then able to remove a fully-developed, dead fœtus by the legs. There was some difficulty in getting the remainder of the fœtus out of the uterus. Finally it and the placenta were delivered. Unfortunately, hæmorrhage from the uterine vessels and sinuses occurred; this was successfully arrested. The uterine wound was closed with silk sutures passing through the serous and muscular coats, just escaping the mucous membrane. An additional layer was employed more superficially. In all, sixteen sutures were inserted. The peritoneal cavity was well swabbed and the peritoneum and abdominal wall closed in the usual way.

I removed the sutures after six days. The patient felt well all the time. Her temperature never rose above normal. The pulse-rate, however, was rapid. There was a large amount of albumin in the urine. This cleared up after she was given citrate of potash (3.6 grammes) and infusion of digitalis (7.2 mils) four times a day. I allowed her to sit up in bed on the eleventh day, and she felt quite well. After five weeks she was discharged, and was in perfect health when she left the hospital.

<sup>1</sup> Read at a Meeting of the South Australian Branch of the British Medical Association on December 5, 1918.

## Reviews.

### MAN'S ANCESTRY.

"The Problem of Man's Ancestry" is a pamphlet written by Frederick Wood-Jones.<sup>1</sup> Though the book is a small one, it contains much good matter. The author displays original work and thoughts, and it is therefore a much weightier production than many a big volume. The main idea propounded by the author is that man's origin goes very much farther back than is generally taught by evolutionists, and that the higher monkeys, far from being the precursors of man, are a degenerated branch of the stem from which both they and man have come. His main line of argument is that many of the organs of man show a primitiveness of structure that denote a far back origin rather than a progressive end of development through the higher mammals. For instance: "It is enough to study the hand and forearm of man to note the astonishingly primitive arrangement of bones, muscles and joints, to compare them with a primitive type of reptile and to contrast them with those of a quadrupedal mammal to be certain that at no period has man or his ancestors supported the body weight upon the fore limb resting upon the surface of the earth." Man differs from apes and monkeys in three general directions; he does not possess several features which monkeys do, he retains certain features which they have lost, and he possesses several distinct specializations. A study of comparative anatomy shows primitive characters in man as to bones, muscles and internal organs, and to such an extent that the impression is gained that man's origin goes back a long way and is not an end on progression from the higher monkeys. Certain specializations, whereby man differs from other primates, such as the architecture of the upper jaw and the structure of the foot, can be traced back a long way, and tend to show he is a more primitive animal than the ones from which he is supposed to have sprung. The book is a challenge to the ultra-Darwinists. The author repudiates the theory of the struggle for existence and the survival of the fittest as applied to the development of man, and in this he is in accord with Bateson and a host of younger biologists, who regard specialization in development not as a pathway to higher forms, but as an advance along a road leading to extinction.

We have received the following excerpt from the report of the Officer Commanding troops on His Majesty's transport *Borda*, dated September 29, 1918:—

On arrival at Sierra Leone, the Transport Officer and Naval Medical Officer visited this transport and informed us that the town was quarantined and all communication with the shore prohibited. A serious outbreak had occurred of Spanish influenza in a virulent form, also yellow fever; 600 of a crew of 800 of one of the warships were in the local hospital, and about 70% of the inhabitants were stricken down with one or other of the diseases. Captain J. S. McLean, Australian Army Medical Corps, immediately offered his services; I at first discouraged him, but as he pointed out that he considered it his duty to go, granted the necessary permission, since the port was one of great importance to Imperial communications. His offer was immediately accepted by the General Officer Commanding West African Military Command. The next morning the Principal Medical Officer came aboard and made an appeal for two doctors; I am proud to say that the following twelve medical officers responded, and unhesitatingly offered their services: Captains B. L. Hart, J. S. Proctor, R. A. Dart, O. G. Tunks, G. J. M. Saxby, J. K. Patrick, R. M. Allan, M.C., D. Aiken, D. G. May, J. S. Green, D. G. Robertson and W. A. James. After consultation with the Senior Medical Officer (Major G. L. Lawson Kerr) I nominated Captains R. M. Allan, M.C., and J. K. Patrick. It was with this magnificent spirit of self-sacrifice that they went forth to do their duty, and by their action they are upholding the high standard of the profession, whose members have done such noble work throughout the great war.

<sup>1</sup> The Problem of Man's Ancestry, by Frederick Wood-Jones; 1918. London: Society for Promoting Christian Knowledge; Sydney: Angus & Robertson, Ltd.; Pocket Size, pp. 48. Price, 10d. net.

# The Medical Journal of Australia.

SATURDAY, JANUARY 11, 1919.

## A Retrospect.

### I.

We recognize that it is difficult, if not impossible, to obtain, in its true perspective, an historical survey of events immediately after their completion. The relative importance of different happenings is differently interpreted according to the mentality of the historian, and the reliability of so-called scientific facts increases with time and the repetition of tests controlling the original results. Notwithstanding this admission, it is of use to take an annual survey of recent events, and to make an attempt to assay the significance of the various advances as they appear to us at the time. The following review of the events and more important advances in the various branches of medical activity should be regarded rather as an interim report than as a definite review, and the prominence given to any one chapter should not be accepted as a final measure of its true significance. In five, ten or twenty years it will be possible to determine what real progress was made in the year 1918. This article will serve to remind medical practitioners of what is being done by their colleagues in the different parts of the world, and it will also recall the fact that the medical profession has many functions other than those connected with the treatment of the sick.

### The War.

The final year of the great war has still many secrets, which will gradually be divulged to the medical public. One of the most important events in the organization of the War Office and of the Department of Defence is in connexion with the War Records Section. We have recently called attention to the development during the year 1918 of the medical department of the Australian War Record Section, under the able direction of the official collator, Colonel A. Graham Butler, D.S.O.. Out of small beginnings,

he has gradually evolved a many-sided office, and the striking manner in which he is handling the cumbersome material already at his disposal, seeking other data to fill in the spaces left by the neglect, the inability to find the necessary time or the failure to grasp its significance on the part of some of the over-worked medical officers, gives full promise of success in the near future. The work undertaken will result in a valuable medical history of the part played by the Australian Imperial Force in the war. The form of the history is not yet settled, but we have reason to hope that all the scientific data will be presented in detail, in order that further research may be undertaken with the information supplied as a basis. An unillustrated book cannot compare in intrinsic worth with one containing many pictures; the medical history is to be freely illustrated by actual specimens, which will be housed in the museums of the medical schools of the three Australian Universities. The specimens have been collected in the several units and selected and forwarded to Professor Arthur Keith, the Curator of the Museum of the Royal College of Surgeons, in London, by Lieutenant-Colonel H. S. Newland, D.S.O.. At the College of Surgeons the task of conservation has been carried out by Professor Keith, with the assistance of Major W. K. Inglis. The latter is now proceeding to Australia with the specimens.

The year 1918 witnessed certain important changes in the organization and administration of the Australian Army Medical Corps, both at home and abroad. With the appointment of Lieutenant-Colonel R. B. Wade as Consulting Orthopædic Surgeon in Australia, the establishment of an orthopædic service was at last commenced. The preliminary steps included the holding of a conference in Melbourne, and the discussion at this conference of the general principles on which the work should be based. The equipment of orthopædic annexes (commonly called curative workshops) in connexion with the military hospitals was recommended, and the first duty of Lieutenant-Colonel Wade was to carry this into effect. In this sphere of military medical activity exceedingly good work has been conducted in various parts of the Commonwealth, notwithstanding the prolonged defects in the organization. The achievements of Lieutenant-Colonel F. A. Hadley at the Fremantle Base Hospital,



under anything but ideal conditions, has aroused general admiration.

At headquarters there have been many changes. The departure of Surgeon-General R. J. A. Fetherston, on a mission to England, Egypt and America, necessitated the appointment of Surgeon-General G. Cuscaden as temporary Director-General Medical Services, and the resignation of General Fetherston, on his return, led to the permanent appointment in his office of General Cuscaden. Other changes in the *personnel* of the headquarters' staff have also been effected, and during the second six months of the year 1918 a number of reforms of greater or less importance have taken place. A conference on military neurology indicated the desire of the Director-General to improve the method of handling returned soldiers, incapacitated by war affections of the central nervous system.

There have also been changes in the administrative headquarters of the several military districts, notably in the Second Military District. The enquiry into the administration of the No. 4 Australian General Hospital at Randwick, by a wholly incompetent committee, impelled us to issue a serious protest against placing medical matters into the controlling hands of lay persons without special knowledge. The enquiry led to the discharge of three prominent medical officers, and to the appointment of Lieutenant-Colonel Eric Sinclair as Principal Medical Officer of the Second Military District. The organizing ability of this officer has enabled him to conduct many reforms of an important nature.

On the other side the work has progressed as before, to the great credit of the medical profession, under the magnificent direction of Surgeon-General Sir Neville Howse, V.C.. Many men joined the Australian Imperial Force and proceeded to the front, while others who had been on active service for long periods, were permitted to return. Unfortunately, the Army Medical Corps has lost twenty-one medical officers during the year. A large number of medical officers distinguished themselves on the field, and suitable awards have been granted. In addition, the sons of many Australian medical practitioners have earned military honours, while not a few have, alas! fallen in battle. It is with sincere regret that we have found

it quite impossible to publish the records of sons of medical practitioners serving in the combatant forces. It will be recognized that a very elaborate investigation would be needed to set up a record of all these brave men.

The work of the Repatriation Department has made some progress during the year, but, unfortunately, there has not yet been effected that co-ordination between this Department and the Department of Defence, which, in our opinion, is essential for the expeditious and economical re-habilitation of our soldiers. Much of the work of the Department is of a highly technical medical nature and even this work has been placed in the hands of laymen, and of medical men who have not specialized in orthopaedic and reconstructional work. The close co-operation between the expert technician and the orthopaedic surgeon, so eminently desirable in the interests of all returned soldiers, is not yet an accomplished fact, although there are some indications that steps will be taken in the near future to bring about this liaison.

The re-organization of the Naval Medical Service has already borne good fruit, and unstinted praise is due to the Director of Naval Medical Services, Fleet-Surgeon A. C. Bean.

#### The British Medical Association in Australia.

During the year the Federal Committee has revealed increased activity, and has taken up many problems of signal importance. Its constitution, unfortunately, prevents this Committee from dealing promptly and expeditiously with matters affecting the interests of the medical profession. The meetings held in February and August were important. Headway has been made in connexion with the Medical Officers' Relief Fund, and trustees have been nominated by the New South Wales Branch, to be appointed by the Federal Committee.

The subject of the relations of the medical profession and the public has received attention, and various proposals for the establishment of some form of national medical service, which would render the activities of the medical profession of greater use to the community, are being discussed. The Federal Committee has established principles which must govern the relations of the profession and the public,



and the schemes evolved for a national medical service have to conform with these principles. The Federal Committee has manifested the desire to bind together the Branches of the British Medical Association in Australia more closely than hitherto, and to create a really Australian medical profession.

A very large amount of medico-political work has been undertaken by the six Branches of the British Medical Association. Each year witnesses an increase of this work, and the organization of the executives has consequently to expand, to keep pace with the increasing demands. No changes have been brought about in the machinery of any of the Branches, but the number of council and other meetings have been increased in several instances. Great activity has been displayed in the Victorian Branch, as a result of the determination to introduce a model form of agreement between friendly societies and lodge surgeons. At first the negotiations were conducted with the several orders, but the orders then requested the Branch to deal with the Friendly Societies' Association. The medical profession maintained its right to determine the extent of the concessions that should be granted to persons of small means, while the "other side" used every political means to withdraw this right from the medical profession. Acts of Parliament and Royal Commissions failed to bring about a settlement, and the year was nearly dead before any promise of an adjustment was in view. As a result of a genuine endeavour on the part of the Council of the Branch, conditions to a settlement, undoubtedly favourable to the friendly societies, were submitted to the Disputes' Committee of the Friendly Societies' Association, and were accepted. It then transpired that this institution, as was suspected from the start, had no power to bind the orders or the lodges in any agreement and, after some further negotiations, it became necessary to intimate to the orders that the Branch would not deal collectively with them in the future. It is doubtful whether the orders can act authoritatively for the individual lodges, and it may be necessary to insist on the acceptance of the terms of the model agreement by the individual lodges. The difficulties have not yet been overcome.

In Tasmania the Branch has been faced with a serious problem, owing to the determination of the

Government to throw open the public hospitals to rich and poor alike. Parliament and especially the Government have been frankly hostile to the medical profession, and the Ministers have not hesitated in distorting and altering facts to blacken the Tasmanian Branch in the eyes of the public. The Government having determined on its policy in regard to the hospitals, grasped the opportunity of appointing a few medical practitioners as salaried officers to conduct the work. Some of these practitioners were members of the British Medical Association, and were aware of the resolutions of their Branch, of the British Medical Association in other parts of the Commonwealth and of the Empire, and of the Australasian Medical Congress. They did not take any steps when the hospital question was being discussed in the Tasmanian Branch, to register their disapproval of the policy, but when offered pounds, shillings and pence by the Government to conduct the hospitals in opposition to the British Medical Association principles, they forgot their obligations to their colleagues and their undertaking to abide by the resolutions of the Association. Those practitioners, who were not members of the British Medical Association, were under no such obligation, although their action in accepting the positions on the staffs of the hospitals rendered them ineligible for membership of the British Medical Association. As long as these members of the medical profession remained on the staffs, no settlement of the difficulties with the Government was likely to be attained. A further complication arose by the discovery that Victor Richard Rattan had been registered in 1907 in virtue of a script purporting to be a diploma of an institution called the Harvey College of Chicago. A Royal Commission has been held to enquire into the two questions formulated by the Premier, and the findings were based on the statements of two persons in Chicago, who signed the document purporting to a genuine diploma. The question whether the Harvey College was or was not a bogus institution in the year 1907 (the term bogus is employed in the sense of not being recognized to conduct the training of, and to issue degrees to, medical students) has not been investigated. There is no doubt from the course of events that the Government has used numerous devices to protect itself and

its *protégés*, and to damage the reputation of the British Medical Association, even at the expense of the interests of the community. The *Medical Act* safeguards Victor Richard Rattan as a registered medical practitioner, and at the same time opens the doors of the medical profession in Tasmania to other American medical practitioners, who might be induced to come to the aid of a government that cannot command the confidence or reliance of the Australian medical profession. The *Hospitals Act* is another short-sighted measure, calculated to lower the efficiency of the hospitals, as institutions for the medical care of the sick poor.

That all Governments are not antagonistic to the British Medical Association is demonstrated by the action of the Federal Government in summoning a conference on the danger of the invasion of Australia by pneumonic influenza, to which the Presidents of the six Branches of the British Medical Association were invited. The majority of the State Governments have also consulted the British Medical Association in this and other connexions.

#### Public Health and Preventive Medicine.

The most important event, in regard to preventive medicine, is the magnificent achievement on the part of the Quarantine Branch of the Department of Trade and Customs, in keeping influenza out of Australia. Quarantine has been applied on many occasions, and in many countries for the purpose of excluding a disease from outside. On no occasion has so large a problem been attempted, and in no other situation has such extensive machinery been cast for the purpose. Critics have complained of the want of accommodation in one or other of the quarantine stations, of the location of the stations, of the alleged laxity of control, and of the supposed rigidity of the regulations which do not admit of the entrance into quarantine of medical men and others over whom the authorities would have no control. All these criticisms revealed the fact that the critics failed to grasp the magnitude of the task. The result of the measures adopted has been that Australia has been kept free of a visitation of a dangerous disease. A member of the International Health Board of the Rockefeller Foundation, who had to submit to quarantine, has expressed his unreserved praise of the man-

ner in which a very difficult problem has been attacked and solved. He pointed out that the size and equipment of the Quarantine Station at North Head, Sydney, were much in advance of any other quarantine station in the world.

Venereal disease continues to attract a great deal of public attention. Perhaps too much. After prolonged resistance the New South Wales Government has fallen into line with those of all the other Australian States, save South Australia, and has passed a measure adopting compulsory notification and compulsory treatment. It has been found necessary to modify the Act in one or two essential particulars in Western Australia and also in Victoria. In Western Australia it has been demonstrated that the diseases are not regularly notified when they attack females, and the amendments aim at the remedy of this defect. Delay was occasioned in Victoria in providing accommodation for the treatment of female patients.

The survey in Northern Queensland by Dr. Waite, of the Rockefeller Foundation, in connexion with hookworm infection has revealed a disastrous frequency and an alarming destructiveness of this disease. The work of repair is being conducted under favourable circumstances, but we regret to learn that Dr. Waite has been compelled, on account of ill health, to hand over the direction of the survey and treatment campaign to Dr. Lambert.

The year 1918 has seen the completion of the building of the Commonwealth Serum Laboratories and the institution of the scientific work in these laboratories, under the able direction of Dr. W. J. Penfold. We venture to express the hope that before another year has passed, the authorities will extend the scope of this institution to include scientific research work.

The returns of the notifications of infective diseases reveal that the public health authorities, in the majority of the States, do not utilize notification adequately for the prevention of disease. Preventible diseases, like diphtheria, still reap a large harvest of lives, while enteric fever, scarlatina and pulmonary tuberculosis are still allowed to incapacitate and kill too many persons. In each State voluntary societies, largely composed of well-meaning enthusiasts without much technical knowledge, have extended their activities, and we view with undisguised alarm the

springing up of manifold baby clinics and private dispensaries and health centres, which owe their existence to the undertakings. To an energetic and modern health department these organizations must prove a nuisance and encumbrance, while to an inefficient department they serve to cloak the defects and to hide the responsibility for sins of omission.

The serious outbreak of poliomyelitis in Victoria, and the dramatic creation of a new disease under the designation of the mystic symbol "X," set clinicians thinking hard, while pathologists have examined the changes, and endeavoured to reproduce the disease under various conditions. Dr. Reginald Webster gives a clear and excellent account of the Victorian disease. From the point of view of prevention, very little has been done.

#### Medical Education.

During the course of the war our Australian Universities instituted a shortened course for medical students, to enable them to take up the duties of medical officers in the Australian Army Medical Corps. The course was shortened as far as actual duration was concerned, but since vacations were cut out and the students were required to expedite their studies during the two final years, the change was not necessarily to the detriment of the young graduates. With the signing of the armistice this arrangement has automatically ceased. The conditions under which the students were allowed to sit for their final examinations before the prescribed time were, that they would offer themselves for service with the Australian Imperial Force. As the Defence Department is no longer sending Australian Army Medical Corps officers abroad, the students' part of the contract cannot be fulfilled and, consequently, there is no further justification for vacation courses and examinations held before the prescribed dates.

The need for a thorough reorganization of the medical course has become more and more apparent during the past year. The standard of education has remained the same in the majority of the branches at the three medical schools. In Sydney a new chair, that of Pharmacology, has been created, and Dr. H. G. Chapman has been appointed the first Professor of Pharmacology. His previous position as Assistant

Professor of Physiology has been filled by Dr. H. Priestley. In Victoria the office of the late Dr. A. C. H. Rothera has remained vacant throughout the year, and bio-chemistry has been taught under less favourable conditions than hitherto. The announcement of the pending retirement of Professors Sir Edward Stirling and A. Watson from their respective chairs of physiology and anatomy, in the University of Adelaide, has been announced. We have urged in these columns the institution of a chair of pathology, with an adequately equipped and staffed department, at the University of Adelaide. The need for improved teaching in pathology will scarcely be challenged, and we have yet to hear of a valid reason for further delay, other than that of lack of funds.

The number of entrants into the three medical schools during the past year has been satisfactory. Difference of opinion exists as to the desirability of tempting more and more into the schools. There does not appear to be any need for apprehension, provided that the curriculum is revised, and rendered more uniform than it is at present. Medical sciences demand an increasing amount of learning from medical students, and if a six years' course be adopted at the three Universities, with a well-planned scientific education to justify it, the question of numbers will adjust itself. When all the medical officers on active service have returned, the needs of the Australian community will be covered as far as the number of practitioners is concerned, and an overfilling of the profession would merely result in two men having to do work that one man can do.

In another column we publish the details of the arrangements which have been made in regard to the continuation of the studies of undergraduates serving in the Australian Imperial Force and now awaiting demobilization. It will be seen that facilities are being given to medical students to continue their studies at the medical schools and universities of Great Britain, and that the professors and teachers are being invited to aid the student in using their time to advantage. The Department of Defence has done wisely in suggesting to the British authorities to recognize class attendances at our own universities, for the purposes of admitting our students to the examinations of the British universities.



## Abstracts from Current Medical Literature.

### PATHOLOGY.

#### (10) Traumatic Shock.

W. B. Cannon opened a discussion on traumatic shock before the Society of Biology of Paris (*C.R. Soc. Biol.*, Paris, October 19, 1918). He defined traumatic shock as a general bodily state occurring after wounds, and characterized by persistent low arterial pressure, rapid pulse, pallor, sweating, reduction of the alkaline reserve and shallow, rapid respiration. The diminished blood pressure is the peculiar feature of shock, and is a measure of its degree. The blood corpuscles become crowded into the capillaries, so that counts of the erythrocytes show a difference, sometimes amounting to 2,500,000 corpuscles per cubic millimetre, in the blood in the veins and in the capillaries. The temperature of the body falls as the man suffering from shock is permitted to become cold, but it rises if he is warmed. Patients suffering from shock become sensitive to ether and to chloroform, both of which substances induce a dangerous reduction of an already low blood pressure. These patients tolerate nitrous oxide and oxygen as an anæsthetic without any fall of blood pressure. The fall of blood pressure is not due to cardiac weakness or to loss of vaso-constrictor tone. It is explicable as a consequence of blood becoming stagnant in some part of the vascular system. The exæmic blood is not in the abdominal veins nor in the arteries. As the arterial pressure falls, the circulation is lessened and the supply of oxygen to different parts of the body is diminished. As a consequence, the amount of lactic acid is increased and this formation reduces the alkaline reserve. Since nerve cells are sensitive to withdrawal of oxygen, sensitive nervous structures are injured and the various reflex mechanisms cease to operate. Shock is not primarily due to loss of vaso-constrictor tone nor to fat embolism nor to acapnia. It is due to the effect of injury to the tissues. The author considers that attention should be paid in the treatment of shock, to the loss of body heat and to the elevation of arterial pressure. Transfusion of blood is preferable, since carriers of oxygen are added to the circulation. A tourniquet should be employed to separate a shattered useless part from the rest of the body. It should be applied near the injured region and amputation should be performed proximal to the tourniquet and before removing it. Ether should be used sparingly, avoiding deep anæsthesia and cyanosis, but it is safer to use nitrous oxide and oxygen.

#### (11) Microbiology of Influenza.

Rappin and Soubrane (*C.R. Soc. Biol.*, Paris, October 12, 1918) sum up their experience of the bacteriology of influenza during the epidemics of 1898,

1904 and 1918. They have found constantly in the expectoration of patients with bronchitic and broncho-pneumonic complications of influenza, a diplococcus similar to that described by Teissier, Roux and Pittion in 1902. The colonies of this germ grow well on glycerinated agar, on blood agar and even on ordinary agar. The microbe forms on these media colonies are difficult to perceive. Broth is not rendered turbid, nor yields an abundant culture. The micro-organism is a small diplococcus, and possesses a faintly visible capsule. Usually the germ colours well with Gram's stain, though occasionally the coloration is faint. The authors have found this microbe constantly in the sputum of patients with uncomplicated influenza during the present epidemic. In only a few cases have they also found the bacillus of Pfeiffer.

#### (12) Cutaneous Diphtheria of the Foot.

J. J. Keegan records the history of a patient admitted to the United States Naval Hospital, Chelsea, Mass., who presented, over the external malleolus of the right foot, a gangrenous ulcer from which cultures of diphtheritic bacilli were grown (*U.S. Naval Medical Bulletin*, October, 1918). The ulcerated surface showed a greyish-white membrane, and was surrounded by a raised hardened border. The sides and back of the leg as high as the knee revealed swelling, redness, tenderness and induration. Smears prepared from the serum on the ulcerated surface exhibited large numbers of bacilli, retaining Gram's stain. These bacilli had the stricture and coloration of *Bacillus diphtherie* after staining with methylene blue or with Neisser's stain. In addition to these bacilli the smears showed numbers of cocci and diplococci, which proved on culture to be staphylococci and streptococci. On Loeffler's blood serum colonies of typical *Bacillus diphtherie* were grown. The patient complained of huskiness and an examination of the throat showed some reddening of the tonsils and of the posterior pharyngeal wall. Diphtheritic bacilli were cultivated from swabs applied to the back of the throat. Seven days before admission a sore had formed on the foot from the pressure of a tight shoe. The sore had spread to form a bleb which was opened three days before admission, when thick pus escaped. The temperature was not raised, but the pulse was slightly quickened. The ulcer was treated with a dressing of antitoxin and 9,000 units of diphtheritic antitoxin were given by intramuscular injection. The ulcer healed slowly, being reduced to one half its size in twenty-one days, though the bacilli could no longer be found in the ulcer after the second day, and in the throat after the ninth day.

#### (13) The Bacillus of Pfeiffer.

A. Lataple (*C.R. Soc. Biol.*, Paris, October 12, 1918) points out that the influenza bacillus readily maintains its vitality *in vitro*, although it is neces-

sary to make subcultures every five days, if the bacillus is to be kept alive on artificial media. In the abscesses which follow the injection of cultures of the bacillus under the skin of guinea pigs, rabbits and hares, the micro-organisms remain alive and virulent for three or four months. The microbes also retain their viability for two or three months in bags of collodion placed in the peritoneal cavity of guinea pigs. In some instances the author has noted that the germs were alive after twenty-two months' sojourn within the abdominal cavity. The organism which has been used in this investigation was isolated in 1903 by M. Siateneano from a patient suffering from influenza. The virulence of this germ has been increased by repeated passages through guinea pigs. The author has succeeded in immunizing hares, by injecting them with dead cultures at first under the skin, later in the peritoneum and afterwards in the veins, and by following alternatively with injections of dead and living cultures. The reaction has been considerable and several hares have died during immunization. The serum used for the tests has been taken from a hare immunized for eleven months. Injected, along with the bacilli, it preserves guinea pigs against a dose of bacilli three of four times greater than that usually required to cause death. The author mentions that the serum of the immunized hare is toxic and causes death during fourteen days after each antigenic injection. The immunized serum must, therefore, be withdrawn after an interval of three weeks.

#### (14) Cerebral Metastatic Hydatids.

F. Dévé states that cerebral metastatic hydatids are due to the development of scolices, liberated by the intracardiac rupture of a primary hydatid cyst of the left side of the heart (*C.R. Soc. Biol.*, Paris, June 22, 1918). He has carried out some experiments to obtain more information about the early stages of the production of metastatic cysts. He injected 0.5 c.cm. of hydatid fluid, containing scolices, into the carotid artery of a rabbit. The animal died forty hours later. Small hæmorrhages were visible on the convexity of the brain. Sections were cut to permit a careful examination with the microscope of the distribution of scolices in the brain. Rather more than one half of the scolices were found lying in the pia mater, the remaining scolices being in the superficial layer of the brain. The author points out that the metastatic cysts are usually multiple and frequently bilateral. They are most often found in the cortical and sub-cortical areas of the brain and the meninges are involved.

### PÆDIATRICS.

#### (15) Hæmoptysis in Children.

By hæmoptysis is meant that there is enough blood from the lungs to colour the sputum. Many other sources of



the blood must be excluded before a diagnosis of hæmoptysis can be accepted. Although the cause of bleeding from the lungs may be pneumonic, chronic passive congestion, lung abscess or gangrene, bronchiectasis or emphysema, it is from a tuberculous focus in by far the greater proportion of cases in children. Hæmoptysis in childhood is very rare, and when it does occur as an early symptom, it is generally due to pressure on, and to erosion of, a vessel in the region of the hilus, by enlarged or caseous lymph glands. If the lesion were further out in the lung there would occur, owing to, the hæmorrhage, a pneumonic area, or marked dissemination of the disease. Pierson (*Arch. of Pediatrics*, September, 1918) reports five cases of hæmoptysis, in which there was evidence only of glandular and periglandular tuberculosis. In addition to the ordinary clinical examination of the patients, X-rays were used, and provided a very definite help in diagnosis. In conclusion, the author states that (1) all the five cases of hæmoptysis were due to bronchial gland tuberculosis; (2) the hæmoptysis was probably due to pressure on, and erosion of, a vessel near the hilus, by an enlarged gland; (3) two cases that had tonsillectomy performed under a general anaesthetic did not improve as they should and would have done without such operation; (4) four of the five patients had been exposed to tuberculosis; (5) two cases occurred in children of five years, one in a child of six and two in children of nine years, four being girls and one a boy; (6) physical signs corresponded very definitely with the Röntgenological findings; there was always increased dullness over the hilus, and possibly over the more affected lung, but this was not so prominent a sign as the increase in harshness in the breathing. (A musical quality to inspiration and expiration is of great importance, as denoting a potentially active irritating process.) The signs corresponded to the increased hilus thickening, but the X-rays went further in showing the extent of the fine markings near the periphery. It also showed the dissemination or calcification of the lesions as they progressed.

#### (16) Treatment of Enuresis Without Drugs.

Infants may begin to acquire control of the mechanism of normal urination during their waking hours at the end of the first year. If they do not gain control during the third year, incontinence may be said to exist. Enuresis in childhood is, therefore, not a disease, but simply the persistence of an infantile condition or habit. In the treatment of enuresis Emerson (*Amer. Journ. of Dis. of Children*, May, 1918) employs four methods, all or one of which may be used in a given case. (1) Mental suggestion. This consists in arousing the patient's interest and attention to the act by rewards and other mental suggestions, and suffices in about 40% of all cases of enuresis. (2) Establishing the "dry habit." This

is accomplished by teaching the reflex to act at regular intervals, and always before the time the "wet habit" occurs. The patient is always dry, the periods of urination are gradually lengthened, and by systematic training the mechanism of urination soon acts under the patient's control. (3) Local irritation. This is brought about by irritating the vesicular sphincter and the posterior urethra by means of a *bougie-à-boule*, so that sensory impulses passing to the brain will become intensified sufficiently to attract the patient's attention, until the habit of control is gained. The bougie should be used under antiseptic conditions, introduced painlessly into the bladder and passed in and out through the sphincter about four times. This causes a sensation of discomfort during the next few urinations. This sensation of discomfort in urinating brings the act into the child's consciousness, aiding him in control. (4) Cerebro-spinal irritation. This is produced by the injection into the spinal canal of normal saline solution, thus causing such stimulation as to arouse the whole mechanism into consciousness, when habit will hold it under control. A small trocar is used, as for lumbar puncture, with cocaine analgesia. Ten cubic centimetres of spinal fluid are withdrawn and 12 c.cm. of freshly prepared normal saline solution injected into the spinal canal. The child is then kept in bed for at least six hours. There is apt to be some reaction, such as headache and nausea, unless the solution is prepared from freshly distilled water and filtered. This method is necessary only in extreme cases, or where there is a complicating mental deficiency, and should be used only when other treatment fails. The author reports 34 cases terminating in cure. There were nine cases in Group I., ten cases in Group II., four in Group III., and eleven in Group IV. In the latter group there were five patients over ten years of age, one being aged nineteen.

#### (17) Thick Farina in Pyloric Stenosis.

It has been found that the condition in infancy characterized by severe vomiting, the so-called "neurotic vomiting," in which there is no anatomical obstruction to the outflow from the stomach, can be successfully treated by the administration of thick cereal foods. The thickness of the food prevents regurgitation and aids the normal passage of food through the pylorus and into the duodenum. Acting on this principle, Sauer (*Arch. of Pediatrics*, July, 1918) decided to apply the same method of feeding in cases of pyloric stenosis. Twelve cases were treated in this way, and in all but one the effect of the thick farina feedings was striking. In eleven cases the vomiting soon stopped, although the peristaltic waves and the palpable tumour, when present, persisted in several for weeks or months after the vomiting ceased. Eleven of the twelve patients remain in excellent health; the twelfth died of bronchopneumonia eight weeks after the vomiting ceased. Of the twelve infants, all

but two were on the breast when vomiting began; eleven of the infants were taken care of in the home, six by the mother without trained assistance. Nine cases were in boys and three in girls. The majority of the infants were seen at an age of from six to eight weeks. The preparation of the food is of importance. It must be thoroughly cooked and sufficiently thick to adhere to an inverted spoon. An average mixture should consist of 260 c.cm. skimmed milk, 360 c.cm. water, 90 c.cm. farina and 45 c.cm. dextri-maltose, all boiled for an hour in a double boiler. Administration of the food is a tedious matter. The best way is to have the required amount in a cup standing in hot water. A little of the warm, thick cereal is taken on the end of a narrow tongue-depressor, placed far back and scraped off with another depressor. A great deal of patience is usually required during the first week, as the infant often keeps the food in the mouth for some time before swallowing. An hour or more is often required to give a feeding of a few tablespoons. Two to eight tablespoons should be given six or seven times daily. Breast milk may be given directly after a cereal feeding or even alternately with it. After the feeding the child should be placed on the right side; it should seldom be taken up or handled.

#### (18) Erythema Nodosum.

A typical case of *erythema nodosum* in a boy of nine years is reported by Bronson (*British Journ. of Children's Diseases*, April-June, 1918). The affection was complicated by the supervision of a tuberculous pleural effusion. The author discusses the disease in relation to other diseases, and especially to tuberculosis, giving a résumé of the literature on the subject. He arrives at the following conclusions: (1) The supposed relationship of *erythema nodosum* to acute rheumatism lacks clinical support. The joint pains, which are frequently present in *erythema nodosum*, do not respond to anti-rheumatic treatment, and the joints bear no resemblance to those in rheumatic fever. Carditis does not form a part of the *erythema nodosum* picture. (2) The presence of a definite prodromal stage, often with sore throat, an eruptive stage and a slow convalescent period is evidence in favour of the disease being a specific one, of a mildly infectious type. Against this is the fact that the patients are usually isolated, and only rarely has a contact developed the disease. (3) Since *erythema nodosum* occurs in a variety of conditions, the possibility that it is a non-specific cutaneous manifestation of a general toxæmia must be considered. The fact, however, that in the majority of cases no other illness is detected disproves this supposition. (4) In favour of a tuberculous aetiology is the strong reaction to tuberculin and the clinical association of the two conditions. Against it is the comparative rarity of such association in hospital practice. (5) The aetiology of *erythema nodosum* has not yet been established.

## Medical Matters in Parliament.

(Continued from page 19.)

In the Legislative Assembly of New South Wales the Venereal Diseases Bill was read a third time upon December 6, 1918.

The Honourable J. Garland moved, in the Legislature Council upon December 6, 1918, with concurrence that so much of the standing orders be suspended as would preclude the passing of the Venereal Diseases Bill through all its stages during the sitting of the Council. The motion was agreed to.

The Venereal Diseases Bill was received in the Legislative Council and read a first time.

The Honourable J. D. Fitzgerald moved that the Bill be read a second time. After pointing out the ravages caused by venereal diseases, he stated that both syphilitic disease and gonorrhoeal disease were known at the present time to be curable. He confessed that the Bill was conservative, and that they had not ventured on many drastic experiments. He dealt briefly with the clauses of the Bill *seriatim*. First of all they proposed to appoint a Commissioner. He might say at once that the Commissioner would be the Director of Health, since he was the most suitable man by reason of the office that he held.

In answer to the Honourable J. B. Peden, who mentioned that this provision had been altered in another place, the Honourable J. D. Fitzgerald said that he had not had an opportunity of seeing the amendments made in another place. He saw that the clause provided for the appointment of a medical practitioner as Commissioner.

The Minister appointed and, if it was left at large, he would have no hesitation in appointing Dr. Paton. If, however, there was a better man to be appointed he would not hesitate to appoint the best man if he could.

The Honourable G. Black thought that the Bill was a good one, although he was not strongly in favour of compulsory notification, for the reason he was afraid that it would lead to concealment. He was of opinion that the Federal Government should pass a Bill to give power to detain venereal suspects in quarantine until they were cured. He considered that steps should also be taken to segregate the aborigines who should be under rigid supervision in camps.

The Honourable Dr. J. B. Nash opposed the Bill on the ground that it was an infringement of the confidence between the patient and the doctor. There were words in the Bill which had practically no meaning. The word "cured" had no meaning. The medical profession did not cure, it only treated. The most expert man in the country could only say in regard to these diseases that, after as exhaustive an examination as they could make, there was no evidence that the disease existed in the individual. He did not think that they would be able to diminish these diseases by act of parliament. They could try. They could spend a little more money, and he hoped it would do good. There was a better way in which they could keep the disease down, and that was by educating the people to a high stand of personal honour, which would forbid it.

The Honourable J. B. Peden intended to support the Bill. He hoped that the Bill would be amended, to permit the compulsory examination of persons suspected to be suffering from venereal disease.

The question was resolved in the affirmative, and the Bill was read a second time.

In Committee, Clauses 1, 2 and 3 as read were agreed to.

In Clause 4, dealing with the necessity of the patient obtaining treatment, the words "the preceding sub-section of" were inserted after the word "contravening" in sub-clause (2). On the motion of the Honourable J. D. Fitzgerald, the words "his name and address so furnished to him" were substituted for the words "name and address of any such person" in sub-clause (3).

The clause as amended was agreed to.

Clauses 5 and 16 inclusive, as read, were agreed to.

The Honourable J. A. Brown moved to insert before clause 17 a new clause, giving power to the commissioner to require any person to consult a medical practitioner, and to produce to the satisfaction of the commissioner a certificate of such medical practitioner that the person was or was

not suffering from venereal disease, and to issue a warrant for the detention and examination of the person, if such medical certificate was not provided. After some discussion the amendment was withdrawn by leave.

In clause 17, dealing with the employment of persons suffering from venereal diseases, the Honourable J. D. Fitzgerald moved that the words "any person who, knowing himself to be suffering from any venereal disease, works" be substituted for the words "every person who, while suffering from any venereal disease in a communicable form, is knowingly employed or engaged," that the word "human" be inserted after the words "intended for," that the words "by any other persons or person" be struck out, and that the following sub-clause be substituted for sub-clause (2):—

Any person who knowingly employs or continues to employ any person suffering from a venereal disease in an infectious stage at any work or in any capacity requiring him to handle food intended for human consumption, shall be liable to a penalty of not less than £20 and not exceeding £100.

The amendments were agreed to, and the clause as amended was adopted.

Clauses 18 to 32 inclusive, as read, were agreed to.

On clause 33, dealing with regulations under the Act, the Honourable J. G. Farleigh moved to add the words "of which notice has been given" after the word "resolution" in paragraph (d) of sub-clause (3).

The amendment was agreed to, and the clause as amended was adopted.

The preamble and title as read were agreed to.

The Bill was reported with amendments, the report was adopted, and the Bill was read a third time.

On the same day the Legislative Assembly considered in committee the amendments made in the Legislative Council.

The Premier (Mr. W. A. Holman) said he thought he was correct in saying that all the amendments were minor alterations in the language of the Bill, introduced by the Council in order to make the meaning clearer. There was no alteration of principle. He moved:—

That the Committee agree that the Legislative Council's amendments in this Bill.

Mr. W. J. McKell said that the Premier had promised that he would make provision in clause 4 for those specialists in venereal diseases who treated such a large number of patients that it would be quite impossible for them to do their medical work in addition to keeping the records of the names and addresses of patients. On that account it was necessary for them to have clerical assistance to keep these records. There was a possibility that they might be fined, because of their permitting their assistants to know the names of patients.

The Premier was sorry that there appeared to have been an oversight. He would endeavour to get over the difficulty by a regulation.

The motion was agreed to. The resolution was reported, and the report was adopted.

The Royal Assent was given upon

## Naval and Military.

### CASUALTIES.

We regret to record the death of Major John Mitchell Mehaffey, Australian Army Medical Corps, which took place in Melbourne on January 1, 1919. Major Mehaffey has been serving until recently in Rabaul, New Guinea.

### HONOURS.

The following honours have been granted to members of the Army Medical Corps on the occasion of the New Year:—  
Knight Commander of the Order of the British Empire.  
Colonel Sir Almroth Wright, C.B.E., F.R.S.

Sir Almroth Wright, who was knighted in the year 1906, held the position of Demonstrator of Physiology at the University of Sydney in the years 1889-1891. The value of his services in connexion with the war, and more especially with the treatment of septic wounds and with the produc-

tion of artificial immunity against enteric fever and other infective processes, has enhanced his already great reputation.

*Companion of Saint Michael and Saint George.*

Colonel C. J. Martin, F.R.S.

Colonel Martin has, notwithstanding the fact that he left Australia several years ago to take up the important position of Director of the Lister Institute of Preventive Medicine, persistently identified himself with the Australian forces during the war. The medical profession in Australia will be gratified that his valuable services in Lemnos and in France have been recognized.

Major-General Charles Snodgrass Ryan, C.B.

Colonel James Adam Dick.

*Commander of the Order of the British Empire.*

Colonel Graham Patrick Dixon, A.A.M.C.

Colonel Henry Carr Maudsley, C.M.G.

Lieutenant-Colonel Douglas Murray McWhae, C.M.G.

*Officer of the Order of the British Empire.*

Colonel Charleton Yeatman.

Major David Moore Embleton, No. 8 Field Ambulance, A.A.M.C.

Major Francis Teulon Beamish.

Major Charles Napier Finn, 2nd Australian General Hospital, A.A.M.C.

Major Alfred Fay Maclure, No. 1 Australian Casualty Clearing Station, A.A.M.C.

Lieutenant-Colonel William George Dismore Upjohn, No. 3 Australian General Hospital, A.A.M.C.

Lieutenant-Colonel Charles Bickerton Blackburn, No. 14 Australian General Hospital.

Lieutenant-Colonel Robert Fowler, No. 14 Australian General Hospital.

Lieutenant-Colonel John Colvin Storey, A.A.M.C.

Major Neil Hamilton Fairley, A.A.M.C.

Major George Charles Willcocks, M.C.

*Distinguished Service Order.*

Lieutenant-Colonel Roy William Chambers, No. 11 Field Ambulance, A.A.M.C.

Lieutenant-Colonel William E. Loderwyk H. Crowther, A.A.M.C.

Lieutenant-Colonel George William Macartney, A.A.M.C.

Major Archibald McKillop, No. 1 Field Ambulance, A.A.M.C.

Major Claude Morlet, No. 13 Field Ambulance, A.A.M.C.

Major William Alexander Morton, A.A.M.C.

Major Vincent Wellesley Savage, No. 1 Australian Casualty Clearing Station, A.A.M.C.

Major William Campbell Sawers, No. 2 Australian General Hospital, A.A.M.C.

*Military Cross.*

Captain John Mackay, No. 2 Australian General Hospital.

Captain C. Anderson.

The following members of the Australian Army Medical Corps have been decorated with the *Croix de Guerre* by the President of France:—

Lieutenant-Colonel Ranald Douglas Campbell, D.S.O.

Lieutenant-Colonel Alexander Hammett Marks, D.S.O.

Lieutenant-Colonel Valentine Osborne Stacy.

## University Intelligence.

### ARRANGEMENTS FOR THE CONTINUED EDUCATION OF UNIVERSITY STUDENTS ON ACTIVE SERVICE DURING DEMOBILIZATION.

We are indebted to the Registrar of the University of Sydney for the following information concerning the facilities which are being placed at the disposal of students of Australian universities during the interval between the cessation of hostilities and their embarkation for Australia. The Australian universities, recognizing that a considerable time would necessarily elapse before students on active service could return from Europe, drew up a scheme for the continuation of the education of students on active service, and

placed this scheme before the Department of Defence. The scheme is as follows:—

1. That facilities be given for Australian university students who have qualified for matriculation or who have broken their course, to attend suitable classes in one or other of the British universities, or other institutions of university rank, *e.g.*, the Imperial College of Science, the Inns of Courts, medical schools, etc.

2. That such courses should be recognized, *pro tanto*, by their own universities as qualifying courses for degrees.

3. That the Bureau of the Universities of the Empire, which is in possession of complete information in regard to universities of the Empire, be asked to co-operate and to allow the organization and administration of the scheme to be carried out at its office.

4. That the professors of the various Australian universities in England at the time be requested to act as a Board of Advice, with power to consult and obtain the co-operation of such other persons as they may think fit.

5. That the Defence Department be requested to give facilities for the organization of the scheme and to give leave of absence to students.

6. That the Commonwealth Government be requested, where necessary, to make provision for the payment of students' fees, and also to provide assistance in the form of a living allowance.

7. That each university be requested to furnish as soon as possible a certified list of students on active service, showing their actual status in the university. This list should be accurate and definite, in order to provide a basis for the admission of students to status in British universities.

8. That it be suggested to the British authorities to recognize the classes attended in Australian universities, with a view to the admission of students to British universities after a sufficient attendance in Great Britain.

9. That the university admit to corresponding degree such students as have taken British degrees under the previous heading.

With the sanction of the Federal Government an administrative committee, comprising Assistant-Professor Holme, M.A., of the University of Sydney (Chairman), Mr. H. W. Allen, Vice-Master of Ormond College, of the University of Melbourne, and Lieutenant E. V. Clark, Lecturer in Electrical Engineering at the University of Adelaide, has been appointed to carry out the arrangements. This committee, by the kind permission of the authorities, will have its headquarters at the office of the Bureau of the Universities of the Empire, in the Imperial Institute, South Kensington, London, S.W. The committee, working in connexion with the military authorities, will get in touch with those students whose embarkation is delayed, and will send them to the different universities to continue their undergraduate courses, as far as is possible, within the limits of time. Full particulars have been furnished by the Australian universities of the curricula of all their soldier students and of the examinations they have passed. It is understood that the authorities at the several British universities will give them every facility for continuing their studies. The experience gained by Australian students in the well-equipped laboratories in Great Britain and their association with the distinguished professors will be of great advantage to them personally, as well as to Australia.

### THE UNIVERSITY OF SYDNEY.

A meeting of the Senate of the University of Sydney was held on November 4, 1918, at University Chambers, Phillip Street, Sydney.

A letter was received from Mr. J. H. Gurney Brewer, giving information of the death of Professor Theodore T. Gurney, M.A., Emeritus Professor of Mathematics, which took place at Cambridge, England, on September 4, 1918. The following resolution was adopted on the motion of the Chancellor:

The Fellows of the Senate, having been informed of the death of Professor Theodore T. Gurney, M.A., desire to express their sympathy with Mrs. Gurney and his relatives in the loss that they have sustained.

The degree of Bachelor of Arts was conferred upon Oliver Thomas Gardiner.



The following degrees were conferred *in absentia*: Bachelor of Arts—Sydney Leopold Dolph. Doctor of Medicine—Arnold William Dean. Master of Surgery—Stephen Hartford Weedon, M.B.

The Warden reported that the University Company, numbering 137, had gone into camp on the University grounds on September 24, and on October 25, numbering 174, were transferred to Liverpool, and that the company was required to be ready for embarkation on November 16, 1918.

Particulars of the William Charles Wentworth Fellowship, founded in 1862, which had been circulated, reporting that the funds had accumulated on December 31, 1917, to £4,434 5s. 4d., were considered, and it was resolved to refer them to the Professorial Board for report, both as to the sufficiency or otherwise of the funds and for the conditions to be adopted in establishing a travelling scholarship.

A letter was received from the Premier, stating that, in view of the requirements of the military authorities, Ministers could not see their way to recommend a departure from the original proposal to make extensions to the Coast Hospital instead of the Sydney and Prince Alfred Hospitals.

A letter was received from Professor Haswell, expressing the willingness of Professor Liversidge and himself to hand over to the University the funds subscribed for the establishment of a Biological Station. It was resolved that the Seal of the University be affixed to the necessary documents.

The application from Professor Pollock, now on active service, for a further extension of leave was granted.

The suggestion of Mr. John Sulman that competition for the annual prize for aeronautics founded by Mrs. Sulman and by him in memory of their son, Geoffrey Sulman, should be open for competition for the first few years to commissioned and non-commissioned officers who have had experience in flying was adopted.

The following appointments were made: (1) Examiners in Botany for the D.Sc. Examination—Professor A. J. Ewart and Professor Lawson. (2) Dr. B. T. Edye, Demonstrator in Pathology for Michaelmas Term. (3) Mr. H. H. Lush, Acting-Demonstrator in the Department of Civil Engineering, in place of Mr. V. Kenniff, resigning at November 30.

A further meeting of the Senate of the University of Sydney was held on December 2, 1918, at University Chambers, Phillip Street, Sydney.

The Chancellor reported that the Rev. A. H. Garnsey, M.A., had been elected to the vacancy on the Senate caused by the death of the late Sir Philip Jones.

The degree of Bachelor of Arts was conferred upon Mr. Michael Alfred Sullivan.

Correspondence was received from the Department of Defence, enclosing a copy of a letter addressed to the Administrative Headquarters, London, in reference to University education in the Australian Imperial Forces, and also from the Bureau of the Universities of the Empire in regard to education problems.

The following recommendation, contained in a report from the Professorial Board, was adopted: That it is desirable that the Wentworth Fellowship Fund be allowed to accumulate for a further period, until the income therefrom has reached a sum of not less than £300 per annum, before the foundation of a Wentworth Travelling Scholarship is considered.

On the motion of Professor MacCallum, it was resolved: That, owing to the special circumstances in which the Leaving Certificate Examination was held in 1918, candidates who fail to qualify for matriculation at that examination and who present themselves for a matriculation qualification in March, 1919, need not again take the subjects in which they have passed at the above-named Leaving Certificate Examination.

An adjourned meeting of the Senate of the University of Sydney was held on December 16, 1918, at University Chambers, Phillip Street, Sydney.

The following appointments were made: Director of Tutorial Classes: Mr. G. V. Portus, B.A., B.Litt., Lecturer in Drawing in the School of Architecture: Mr. Alfred Coffey. Tutor in History Economics and Political Science, under the Joint Committee for Tutorial Classes: Mr. R. Bronner, B.A. (Adelaide and Oxford Rhodes Scholar).

The following resolution was adopted on the motion of the Chancellor:—

"That a committee be appointed to consider and report upon the steps which should be taken to provide a suit-

able memorial within the University of members of the University, who have given their lives in the services of the Empire in the great war, as well as of those who have voluntarily engaged in active military or naval service. That such committee consist of the Chancellor, the Vice-President, Judge Backhouse, Mr. Nangle, the Chairman of the Professorial Board, the Deans of the Faculties and the Warden and Registrar.

## Correspondence.

### THE NAVAL MEDICAL SERVICE.

Sir,—In two issues of the *Journal* lately you have commended the Naval Medical Service to young graduates about to decide on a career.

In war-time it was the least any of us could do to join up with one of the services, but in peace time there are other considerations.

Most of us wish to earn a reasonable living as a recompense for the years spent in qualifying, and I venture to suggest that the rates of pay offered, especially if a man be married, do not allow of any of the comforts a professional man has a right to expect. It is true that quite recently, and after much haggling, an increase of about 20% was gazetted, but on the figures of the Federal Statistician the cost of living has gone up considerably more during the years of war. So where is the gain? It will not need any very careful analysis of the figures to prove the truth of my statements. No doubt a single man could live on his pay, but a man would have no hope of marrying till he became a Staff-Surgeon, after eight years, say at thirty-two, when, after giving many good years of his life and passing a general knowledge paper in every conceivable branch of medicine and surgery, he would be awarded the princely sum of twenty-five shillings a day. Why, anyone can get two guineas a day as a locum—and all found!

The deferred pay, of course, is useful, but it does not buy bread and cheese for present needs, and probably it could be invested to more advantage in insurance.

The writer has been through the mill, having had three years of war service in the Navy, and only those who have been there, can have an accurate idea of the many subscriptions an officer has to pay in the mess and the expenses he must meet for entertainment.

I know of several officers whose mess bills, without extras, except for wine, were twelve or fourteen pounds a month regularly, and that in war time, when the larger forms of entertainment were banned.

The married man is graciously granted an extra fourteen shillings a week wherewith to pay rent and otherwise maintain an establishment ashore. Does the *Journal* seriously maintain that a service such as this is attractive? A man may not look for wealth in serving his country, but surely he may expect common decency.

The service, generally speaking, is an easy life, and for the indolent and professionally unambitious it may have its points, but the attractions end there. The fault lies in appointing a gentleman to the post of Director-General who is an Englishman, with no knowledge whatever of Australian medical conditions, and who, though he is endowed with great energy and powers of organization, can never forget that he entered the Royal Navy years ago on ten shillings a day and that anything in excess of this sum is in the nature of wealth untold. The Naval Medical Service as present constituted is beset with the curse of seniority. Whatever degree a man has taken, and whatever his professional attainments may be, so long as someone else has entered the service before him, so surely will that someone maintain his seniority rank and importance for the rest of his career.

This inevitably breeds stagnation. I have written this so that graduates may really know what they are attacking when entering the Navy, and not primarily to dissuade anyone, and I have made no mention of the trifling fact that a full kit of uniform will cost a hundred and fifty pounds.

Yours, etc.,

December 27, 1918.

"EX-NAVAL OFFICER."

[Our correspondent raises the question whether the Naval Medical Service is commended by this journal to junior



medical practitioners as an attractive service. The reply is distinctly in the affirmative. A young graduate, between the ages of 21 and 28 years, fresh from the medical school, can command a salary of £456 per annum, gradually increasing to £574 per annum, when he obtains his promotion to Staff-Surgeon. This salary is partly deferred. The Surgeon receives from £365 to £419 as regular pay, and at the end of seven years' service he could draw the sum of £680. He is allowed lodging allowance at the rate of 4s. a day when he is not provided with accommodation or quarters on board, and rations are also supplied. "Ex-Naval Officer" assesses the cost of uniform at £150, a high figure, but he does not mention that the Surgeon, on joining, receives £40 as uniform gratuity, and after the first year he receives a uniform allowance of £18 5s. per annum. We venture to claim that the rate of remuneration for young graduates is not less generous than that granted in the other services, either civil or military. The increase in the cost of living hits the naval or military officer less than the civil servant, who is not in receipt of rations of any kind. Our correspondent speaks of Australian medical conditions, and quotes the remuneration paid to practitioners acting as *locum tenentes* of two guineas a day. In the first place, this is undoubtedly a rate of payment created by war conditions, when there was a distinct shortage, and when, in many practices, additional work had to be done. He assumes that this rate of payment will be maintained, and he ignores two facts. In the first place, this sort of work is usually of a very temporary nature, and the man who seeks it has to provide for as many weeks on the look-out as in work. In the second place, the rate of remuneration paid to *locum tenentes* is out of proportion to the earnings of the general practitioner who has to pay him this amount. It is doubtful whether it is advantageous for a freshly-qualified practitioner to be able to command a salary of this size.

The Naval Medical Service should not be an easy one, fit for the indolent and professionally unambitious. To convert this state of affairs, the Director of Naval Medical Services has introduced into the service three courses of hospital study, and the Surgeons are given sufficient leisure to allow them to study and to conduct research work. The graduate who takes a serious interest in his work will find in the re-organized service ample facilities and sufficient time to enable him to keep up-to-date in his professional work. We hold that the Naval Medical Service offers a very excellent initial career to a young graduate who either wishes to postpone entrance into general practice or who desires to avoid it altogether.]

#### INFLUENZA.

Sir,—During September last there was in this village an epidemic of an "influenza," which was felt in other parts of the State also.

The onset was sudden, the prostration extreme and pneumonia occasionally occurred.

I have been waiting for someone with opportunity for scientific investigation to write an article in the *Journal*, but apparently the armistice and the pneumonic influenza have overshadowed the September outbreak.

May I therefore ask through your pages, of "whom it may concern": (i.) was the September outbreak due to true influenza, (ii.) in what way it differed from the pneumonic influenza?

Yours, etc.,

F. H. COX.

Helensburgh, N.S.W.,  
December 30, 1918.

#### QUARANTINE.

Sir,—There are not many of the profession who will agree with that part of Dr. Arthur's letter where he says "and I fail to see what justification there is for the laudation of the handling of the quarantine question."

In company with many others I offer the utmost praise to the Director and Officials of Quarantine. If ever a body

of men deserved praise these do. While we were threatened with this dire epidemic, they saved the whole of Australia, and it is up to us to play the game, and, instead of carping criticism, to offer our warm congratulations. When Dr. Arthur settles down I am sure he will join in.

Yours, etc.,

JOSEPH L. BEESTON.

Newcastle, New South Wales.

January 30, 1918.

#### THE TREATMENT OF RETURNED MEN.

Sir,—I regret to find that Professor Wilson is only uncomfortable—I thought he would have been ashamed to the very soul as I was—to see the Sydney Medical School "fuller than ever." If he knew how close to disaster and defeat we were last March he must know that his position would have been not merely uncomfortable, but one of extreme danger, if all other medical schools in Allied countries were "fuller than ever." Nobody can deny that if, at a time when the normal flow of students is diverted to active service, it is found that one school is "fuller than ever," those who experience this unusual desire for medical education are largely shirkers. There are exceptions—the physically unfit and men too young—but most in their first four years have joined since the war started.

It is essential for these men's own future and for the future status of the profession that they should be trained by men that have proved themselves not shirkers. This is the important issue—not the degree of Professor Wilson's discomfort.

The President of Sydney Hospital says he has the concurrence of a section of the profession in not giving preference to a soldier. Of course he has, of that section which neither offered nor went, but made hay while the sun shone. These would not grieve overmuch if the soldiers had stayed away longer. But I venture to say that if the Board determines its actions by the support of this section and not of that section of the profession which endorses your able leader's statement—that the appointment should be temporary till the termination of war and then the returned men get preference—Professor Wilson will not only feel uncomfortable, but scandalized at the result to the profession in public esteem in ten years' time.

Everyone with a spark of decent feeling must feel uncomfortable and ashamed at the absence of any proper effort for the repatriation of returning medical men by our associations. Surely these men, who gave up their opportunity of post-graduate hospital work, are going to have places made for them immediately, either as residents in hospitals or as assistants to senior practitioners. Many years ago, at a medical society's dinner, Professor Wilson outlined a scheme of this nature. Will he use his organizing ability to devise, and his unique influence to bring into effect, a plan that will give the young men who have been away at least as good a chance when they make a start in practice as the men who stayed behind?

The question of the rehabilitation of the older men, who have been in practice before the war, is a matter in which the Council of the New South Wales Branch of the British Medical Association should give a lead to the rest of the profession immediately.

Yours, etc.,

"RETURNED MAN."

January 2, 1919.

#### ALVARENGA PRIZE.

The next award of the Alvarenga prize of the College of Physicians of Philadelphia will be made on July 14, 1919, provided that an essay deemed to be worthy of the prize shall have been offered. The essay may be on any subject in medicine. Articles or essays previously published will not be accepted. The essays must be typewritten, and, if prepared in a language other than English, must be accompanied by an English translation. They must be received by the Secretary of the College on or before May 1, 1919. Each essay must be sent without signature, but must be plainly marked with a motto and be accompanied by a sealed

envelope, having on its outside the motto of the paper and within the name and address of the author. The value of the prize is about \$250. The successful essay, or a copy of it, shall remain in the possession of the College. Other essays will be returned upon application within three months of the award.

It has recently been announced that Professor Sir Edward Stirling, C.M.G., the Dean of the Faculty of Medicine of the University of Adelaide, and Professor A. Watson, Professor of Anatomy of the same University, have tendered their resignations, which will take effect at the end of the current year.

### Books Received.

**SYPHILIS, PALUDISME AMIBIASIS, TRAITEMENT INITIAL ET CURE DE BLANCHIMENT**, par Paul Ravaut, Préface du Professeur Fernand Vidal. Collection Horizon: Précis de Médecine et de Chirurgie de Guerre; 1918. Paris: Masson et Cie; Demy 8vo., pp. 88. Price, 4 francs.

**TRAITÉ DE PHYSIOLOGIE**, par J. P. Morat et Maurice Doyon; Fonctions de Relation, par J. P. Morat; Fonctions de Reproduction, par M. Doyon; avec 221 figures en noir et en couleurs; 1918. Paris: Masson et Cie; Royal 8vo., pp. 872. Price, 25 francs.

**GUN-SHOT FRACTURES OF THE EXTREMITIES**, by Joseph A. Blake. Collection Horizon: Précis de Médecine et de Chirurgie de Guerre; 1918. Paris: Masson et Cie; Demy 8vo., pp. 136. Price, 4 francs.

### Medical Appointments.

Dr. A. A. Palmer (B.M.A.) and Dr. J. J. Kelly (B.M.A.) have been appointed members of the Dental Board of New South Wales.

Dr. W. J. W. Close (B.M.A.) has been appointed Honorary Medical Officer at the Port Pirie Hospital (South Australia).

The appointment of Dr. P. Matenson (B.M.A.) as Public Vaccinator for the Metropolitan District is announced in the *Victoria Gazette* of January 3, 1919.

### Medical Appointments Vacant, etc.

For announcements of medical appointments vacant, assistants, locum tenentes sought, etc., see "Advertiser," page xiii.

Public Service Board, Western Australia: Senior and Junior Assistant Medical Officers, Hospital for the Insane.

Renwick Hospital for Infants, Sydney, Junior Resident Medical Officer.

### Medical Appointments.

#### IMPORTANT NOTICE.

Medical practitioners are requested not to apply for any appointment referred to in the following table, without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, 429 Strand, London, W.C.

Branch.	APPOINTMENTS.
<b>VICTORIA.</b> (Hon. Sec., Medical Society Hall, East Melbourne.)	All Friendly Society Lodges, Institutes, Medical Dispensaries and other Contract Practice. Australian Prudential Association Proprietary, Limited. Mutual National Provident Club. National Provident Association.
<b>QUEENSLAND.</b> (Hon. Sec., B.M.A. Building, Adelaide Street, Brisbane.)	Aramac Hospital. Australian Natives' Association. Brisbane United Friendly Society Institute. Cloncurry Hospital.

Branch.	APPOINTMENTS.
<b>TASMANIA.</b> (Hon. Sec., Macquarie Street, Hobart.)	Medical Officers in all State-aided Hospitals in Tasmania.
<b>SOUTH AUSTRALIA.</b> (Hon. Sec., 3 North Terrace, Adelaide.)	Contract Practice Appointments at Renmark. Contract Practice Appointments in South Australia.
<b>WESTERN AUSTRALIA.</b> (Hon. Sec., Health Department, Perth.)	All Contract Practice Appointments in Western Australia.
<b>NEW SOUTH WALES.</b> (Hon. Sec., 30-34 Elizabeth Street, Sydney.)	Australian Natives' Association. Balmain United Friendly Societies' Dispensary. Canterbury United Friendly Societies' Dispensary. Friendly Society Lodges at Casino. Friendly Society Lodges at Lithgow. Friendly Society Lodges at Parramatta, Auburn and Lidcombe. Leichhardt and Petersham Dispensary. Manchester Unity Oddfellows' Medical Institute, Elizabeth Street, Sydney. Marriekville United Friendly Societies' Dispensary. New South Wales Ambulance and Transport Brigade. Newcastle Collieries—Killingworth, Seaham Nos. 1 and 2, West Wallsend. North Sydney United Friendly Societies. People's Prudential Benefit Society. Phoenix Mutual Provident Society.
<b>NEW ZEALAND: WELLINGTON DIVISION.</b> (Hon. Sec., Wellington.)	Friendly Society Lodges, Wellington, New Zealand.

### Diary for the Month.

- Jan. 14.—N.S.W. Branch, B.M.A., Ethics Committee; Executive and Finance Committee.  
Jan. 16.—Vic. Branch, B.M.A., Council.  
Jan. 21.—N.S.W. Branch, B.M.A., Medical Politics Committee; Organization and Science Committee.  
Jan. 24.—Queensland Branch, B.M.A., Council.  
Jan. 24.—Central Southern Medical Association (Annual), Goulburn, N.S.W.  
Jan. 28.—Tas. Branch, B.M.A., Annual Meeting.  
Jan. 29.—Vic. Branch, B.M.A., Council.  
Jan. 29.—Northern District Medical Association (Annual), Tamworth, N.S.W.  
Feb. 4.—Tas. Branch, B.M.A., Council.  
Feb. 5.—Vic. Branch, B.M.A.  
Feb. 7.—Queensland Branch, B.M.A.  
Feb. 11.—N.S.W. Branch, B.M.A., Ethics Committee.

#### EDITORIAL NOTICES.

Manuscripts forwarded to the office of this journal cannot under any circumstances be returned.  
Original articles forwarded for publication are understood to be offered to *The Medical Journal of Australia* alone, unless the contrary be stated.  
All communications should be addressed to "The Editor," *The Medical Journal of Australia*, B.M.A. Building, 30-34 Elizabeth Street, Sydney, New South Wales.